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(56) Documents Cited

GB 2296409 A

GB 2253968 A

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US 5442805 A

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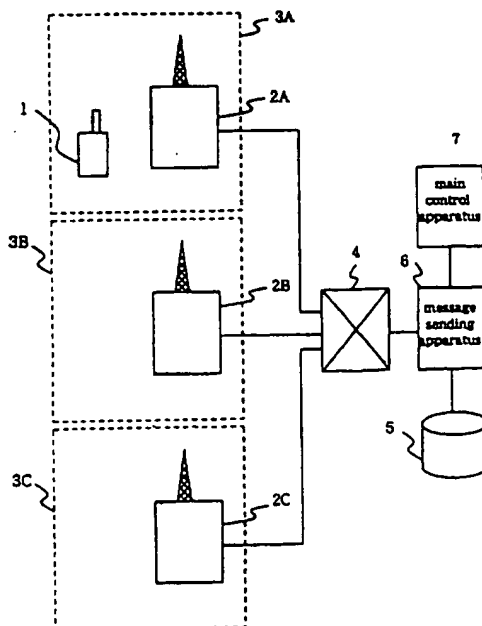
INT CL<sup>6</sup> H04Q 7/22 7/32 7/38

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## (54) Method of Disabling a Portable Terminal of a Communication System

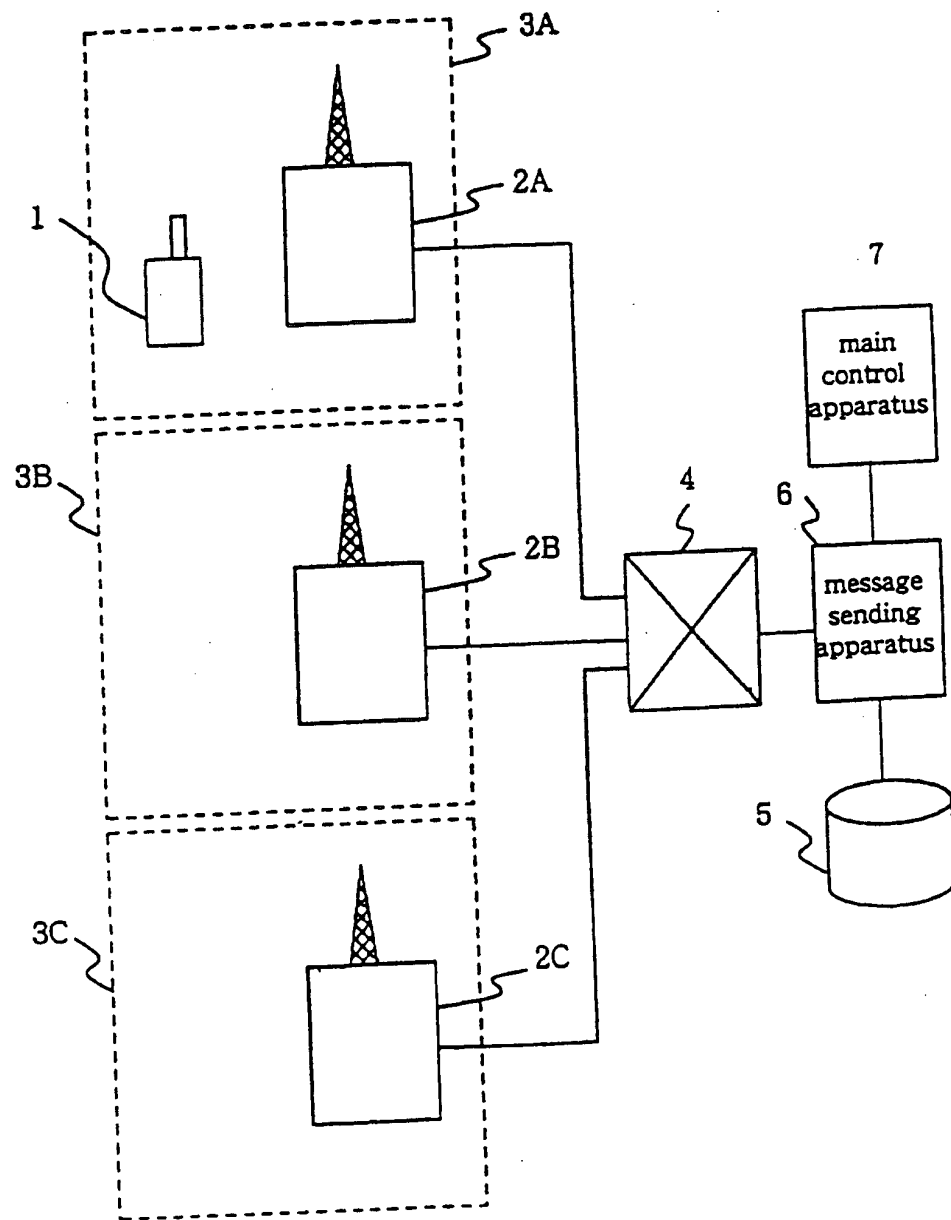
(57) Operation of a handset is allowed in a designated area of a cellular communication system but prevented outside it. A database stores data relating to the location of the handset and data corresponding to the allowed operating area. Comparison of the two establishes whether or not the handset is within the allowed area. If it is not, the exchange functions of the system are inhibited for that handset.

Fig. 1



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Fig. 1



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Fig. 2

position  
information 6A

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permission/inhibition  
information 6B

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available area  
information 6C

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APPARATUS FOR DISABLING A PORTABLE TERMINAL  
OF A COMMUNICATION SYSTEM

This invention relates to apparatus for disabling a portable terminal of a communication system, in particular to a management system for  
5 a personal hand-phone system (hereinafter referred to as PHS) terminal, and more particularly to a PHS terminal disabling system for disabling or invalidating the use of a PHS terminal.

10 A communication system in which PHS terminals are used includes cell sites which communicate with a PHS terminal by means of radio waves, an exchange connected to the cell site, and a data base which is connected to the exchange and holds management data for the PHS  
15 terminals.

Conventionally, a PHS terminal is disabled by manually changing the management data for the PHS terminal on the data base from a use permitting condition to a use inhibiting condition.

20 PHS terminals are frequently lent owing to their portability, and such a disabling process as described above is performed also for a PHS terminal which is not recovered even after the lending term expires.

A system is disclosed in Japanese Patent Laid-Open  
25 Application No. Heisei 3-100894 wherein, when a port-

able terminal is stolen, the theft is manually notified to a host computer, and then, the host computer transmits an identification number of the stolen portable terminal and a code representative of such theft to the  
5 portable terminal so that the stolen portable terminal invalidates, upon reception of the notification, a key inputting operation thereof.

Another system is disclosed in Japanese Patent Laid-Open Application No. Heisei 4-104625 wherein an  
10 owner of a portable terminal which has been stolen or lost sends a transmission inhibition code to the portable terminal to inhibit a transmission operation of the portable terminal.

A disabling operation of a portable terminal in  
15 the prior art systems described above is performed manually and limits the use of the portable terminal with respect to time but does not restrict the available area in which the portable terminal can be used.

20 PHS terminals are lent in most cases in a limited space of an exhibition hall or such like, and where the use limitation of a portable terminal is performed with respect to time as described above. However, since a portable terminal can also be  
used outside the  
25 exhibition hall, a person to whom a portable terminal has been lent is likely to forget to return the portable

terminal. Thus, the conventional systems described above are disadvantageous in that when portable terminals are lent in such a manner the recovery rate is low.

The present invention has been made in view of the problem of the prior art systems described above, and it is an object of at least the preferred embodiment of the present invention to provide a portable terminal disabling system which can raise the recovery rate of lent PHS terminals by limiting the area of use of a PHS terminal.

Accordingly, the present invention provides apparatus for disabling a portable terminal of a communication system comprising a plurality of cell sites for communicating with said terminal, and an exchange for performing an exchanging operation of said terminal via said cell sites, said apparatus comprising:

- a database for storing position information representative of a position of said terminal, available area information representative of one or more of said cell sites provided in an area within which the use of said terminal is permitted, and permission/inhibition information representative of whether the use of said terminal is permitted or inhibited; and

- control apparatus connected to said exchange and said database for:

- updating the position information of said terminal with a current position of said terminal represented by data received from any of said cell sites via said exchange;

- setting, when the position of said terminal is inside an area represented by the available area information, the permission/inhibition information so as to represent permission and permitting said exchange to perform an ordinary exchanging operation; and

- setting, when the position of said terminal is outside the area represented by the available area information, the permission/inhibition information so as to represent inhibition and preventing said exchange from performing said exchanging operation.

The disabling apparatus may be constructed such that it further comprises message sending apparatus for storing at least one message for notifying that use of said terminal is inhibited,

- said main control apparatus outputting, when communication originates from or terminates at said terminal while the permission/inhibition information represents inhibition, a message stored in said message sending apparatus either to said terminal or to a terminal from which communication originated.

Preferably, the communication system is a portable hand-phone system (PHS).

In the PHS terminal disabling system of a preferred embodiment of the present invention having the construction described above, no exchanging operation is performed if a call does not originate from or terminate at any cell site provided in the area represented by the available area information of the data base. Since any PHS terminal can be automatically set to a valid or invalid condition based on the location of the PHS terminal, the available area of the PHS terminal can be limited suitably.

Preferred features of the present invention will now be described, purely by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a block diagram showing a construction of an embodiment of the present invention; and

Fig. 2 is a diagrammatic view illustrating management information regarding a PHS terminal stored in data base 5 in the embodiment shown in Fig. 1.

An embodiment of the present invention is described below with reference to the drawings.

Fig. 1 is a block diagram showing a construction of an embodiment according to the present invention. The present embodiment includes PHS terminal 1, cell sites 2A, 2B and 2C which communicate with PHS terminal

1 by means of radio waves, exchange 4 connected to cell  
sites 2A to 2C, data base 5, message storage apparatus  
7, and main control apparatus 6 connected to exchange  
4, data base 5 and message storage apparatus 7 for  
5 referring to stored contents of data base 5 and con-  
trolling an exchanging operation of exchange 4 in  
accordance with the stored contents.

Cell sites 2A to 2C are located in management  
areas 3A to 3C, respectively. Data base 5 stores  
10 management data for PHS terminal 1 and particularly  
stores, as illustrated in Fig. 2, position information  
6A representative of a current position of PHS terminal  
1, use permission/inhibition information 6B, and avail-  
able area information 6C which represents a list of  
15 cell sites which can be utilized by PHS terminal 1.

Available area information 6C stored in data base  
5 is set in accordance with contents inputted to inputting  
means not shown by main control apparatus 6. On  
the other hand, position information 6A and use permis-  
20 sion/inhibition information 6B are set in accordance  
with data sent thereto from cell sites 2A to 2C via  
exchange 4 by main control apparatus 6. The stored  
contents of data base 5 are updated at any time.

Message storage apparatus 7 stores, amongst other messages,  
25 a message representing that the use of PHS terminal 1 is inhibited.  
Main control apparatus 6 reads



out a suitable message stored in message storage apparatus 7 in accordance with a condition of PHS terminal 1 and sends out the message to a user of PHS terminal 1 or a calling person to PHS terminal 1 via exchange 4.

5           Operation of the embodiment having the above construction is described below.

          It is assumed that the available area of PHS terminal 1 is set to the management areas of cell sites 2A and 2B, that is, to management areas 3A and 3B and  
10   this is described in available area information 6C.  
The current position of PHS terminal 1 is supervised from detection sensitivities of cell sites 2A, 2B and 2C by main control apparatus 6, and the position information is stored as position information 6A in data  
15   base 5.

          Main control apparatus 6 determines stored contents of use permission/inhibition information 6B based on position information 6A and available area information 6C. If the current position of PHS terminal 1  
20   represented by position information 6A is within management areas 3A and 3B represented by available area information 6C, use permission/inhibition information 6B is set so as to represent that the use of PHS terminal 1 is permitted. However, if the current position  
25   of PHS terminal 1 represented by position information 6A is outside management areas 3A and 3B represented by

available area information 6C, then use permission/inhibition information 6B is set so as to represent that the use of PHS terminal 1 is inhibited.

Accordingly, if PHS terminal 1 is positioned within management area 3A or 3B, use permission/inhibition information 6B represents that the use of PHS terminal 1 is permitted, but if PHS terminal 1 is within management area 3C, use permission/inhibition information 6B represents that the use of PHS terminal 1 is inhibited.

If a call originating operation is performed by PHS terminal 1, then main control apparatus 6 refers to the stored contents of use permission/inhibition information 6B in data base 5 and, if the stored contents represent that the use of PHS terminal 1 is permitted, then it controls exchange 4 to perform ordinary transmission processing. On the contrary if the stored contents of use permission/inhibition information 6B represent that the use of PHS terminal 1 is inhibited, then main control apparatus 6 reads out from message storage apparatus 7 a message notifying that the use of PHS terminal 1 is inhibited, for example, a message "You are outside an area in which the telephone can be used.", and sends the message to PHS terminal 1 via exchange 4.

If a call is terminated at PHS terminal 1, then

main control apparatus 6 inquires from data base 5 through exchange 4 about whether the use of PHS terminal 1 is permitted or inhibited, and, if the use of PHS terminal 1 is permitted, then main control apparatus 6 controls exchange 4 to perform ordinary call terminating processing. On the contrary, if the stored contents of use permission/inhibition information 6B represent that the use of PHS terminal 1 is inhibited, then main control apparatus 6 reads out from message storage apparatus 7 a message to notify that the use of PHS terminal 1 is inhibited, for example, a message "The terminal you are calling is outside an available area." and sends out the message to the call originating terminal through exchange 4.

15        Since the present invention has the construction described above, the area for use of a PHS terminal can be limited, and consequently, there is an advantage that the recovery rate of lent PHS terminals can be raised. This advantage is particularly effective where  
20 PHS terminals are lent while limiting the area available to them.

Further, the advantage described above is improved where a message notifying that a PHS terminal is outside an available area is sent out to the PHS terminal  
25 (or another terminal from which a call to the PHS has been originated).

SUMMARY

An object of at least the preferred embodiments of the present invention is to provide a PHS terminal disabling system which includes a PHS terminal, a plurality of cell sites for communicating with the PHS terminal, and an exchange for performing an exchanging operation of the PHS terminal via the cell sites. The apparatus further includes a data base for holding position information representative of a position of the PHS terminal and available area information representative of an area within which the use of the PHS terminal is permitted, and a main control apparatus connected to the exchange and the data base for updating the position information of the PHS terminal with a current position of the PHS terminal represented by data received from any cell site via the exchange and for causing, when the position of the PHS terminal is not included in the area represented by the available area information, the exchange to perform no exchanging.

Each feature disclosed in this specification (which term includes the claims) and/or shown in the drawings may be incorporated in the invention independently of other disclosed and/or illustrated features.

## CLAIMS

1. Apparatus for disabling a portable terminal of a communication system comprising a plurality of cell sites for communicating with said terminal, and an exchange for performing an exchanging operation of said terminal via said cell sites, said apparatus comprising:

a database for storing position information representative of a position of said terminal, available area information representative of one or more of said cell sites provided in an area within which the use of said terminal is permitted, and permission/inhibition information representative of whether the use of said terminal is permitted or inhibited; and

control apparatus connected to said exchange and said database for:

updating the position information of said terminal with a current position of said terminal represented by data received from any of said cell sites via said exchange;

setting, when the position of said terminal is inside an area represented by the available area information, the permission/inhibition information so as to represent permission and permitting said exchange to perform an ordinary exchanging operation; and

setting, when the position of said terminal is outside the area represented by the available area information, the permission/inhibition information so as to represent inhibition and preventing said exchange from performing said exchanging operation.

2. Apparatus according to Claim 1, further comprising message sending apparatus for storing at least one message for notifying that use of said terminal is inhibited,

said main control apparatus outputting, when communication originates from or terminates at said terminal while the permission/inhibition information represents inhibition, a message stored in said message sending apparatus either to said terminal or to a terminal from which communication originated.

3. Apparatus according to Claim 1 or Claim 2, wherein said communication system is a portable hand-phone system.

4. Apparatus for disabling a portable terminal of a communication system substantially as herein described with reference to and as shown in Figures 1 and 2 of the accompanying drawings.



The  
Patent  
Office

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Application No: GB 9609969.2  
Claims searched: ALL

Examiner: Nigel Hall  
Date of search: 26 June 1996

## Patents Act 1977 Search Report under Section 17

### Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:  
UK CI (Ed.O): H4L (LDSK, LDSX)  
Int CI (Ed.6): H04Q 7/22, 7/32, 7/38  
Other: Online: WPI

### Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
X,Y	GB 2296409 A (NEC) see p.10 line17-p.13 line16	1
X,Y	US 5442805 (SAGERS) see col.3 line 56-col.5 line34	1
Y	WO 95/26115 A1 (VODAFONE) see p.16 line 21-p.17 line5	1
A	GB2253968 A (VODAFONE) see p.11 lines 11-17	

X Document indicating lack of novelty or inventive step  
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A Document indicating technological background and/or state of the art.  
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